THE £50 NOSE JOB

Royce Creasey offers a solution to the problem posed by the damage a slack alternator rotor causes to the crankshaft.

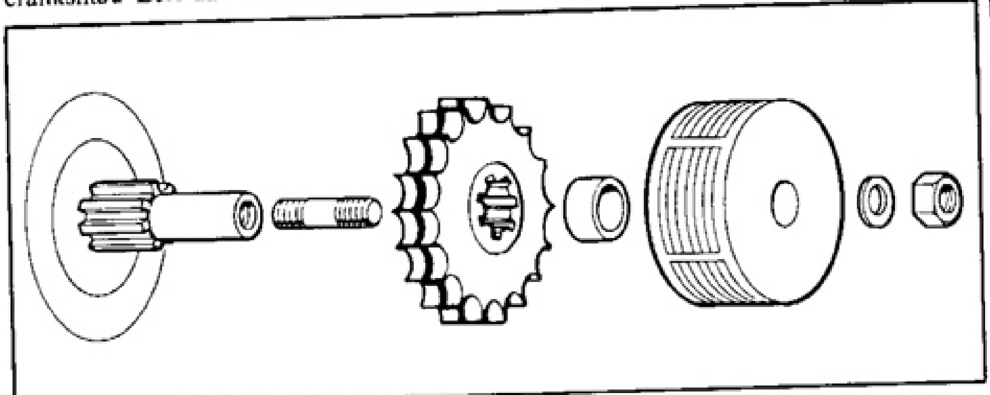
☐ It usually starts as a truly strange noise. A Triumph owner of my acquaintance recently rode several thousand miles with a 'canary squawking to get out of the chaincase'. A Royal Enfield I was riding emitted agonised moans – indeed, I remember a BSA C11G producing obvious mouse noises prior to my very first motorcycle breakdown. What do all these machines have in common? Lucas electrics. Yes, this is another tale of that unholy relationship between the prince of darkness and the English motorcycle industry.

It's the alternator rotor. Having sheared its locating key, it is busily machining away major chunks of both the stator and the crankshaft. Left unattended, as it was on the C11G, sundry other components will also become involved and I was interested to see the retaining nut machine a neat hole in the BSA chaincase and fall into the road. This provided me with an aversion for Lucas alternators and a taste for chaincases with holes in them which has persisted to this day.

Close study of this little set of components rapidly reveals that it is more wonderful that any stay in one piece than surprising that some fall apart. The rotor is centralised by sliding along a shaft. It therefore has a running clearance which uses up a significant proportion of the .012in air gap one is somehow expected to achieve between rotor and stator. It is retained by the simple expedient of clamping it between a nut and a spacer. Location is actually provided by the friction in shear at these faces and the woodruff key usually added can only position the alternator, which may be useful for ignition timing. The clearance required around the key means that if the nut slackens and the locating friction drops, the key will be cut in two. When that happens the rotor is stopped, or at least slowed by the alternator's electrical drag and rapid wear, assisted by bits of woodruff key, takes place on the crank and in the rotor bore. Every now and then this 'bearing' seizes and the somewhat off-centre result chips away at the stator for a change. You may notice a drop in the charging rate around this time.

This method of location works well in simple applications with a steady speed and low accelerations, but one glance at the environment in a British bike's chaincase shows anything but simplicity. The rotor itself is subject to torsional vibration from the pulsing loads imposed by the alternator magnets. It is driven by a shaft with its own pulses, produced at high frequency by the firing strokes and at lower frequencies but much higher amplitudes by the rider's right hand. The rotor concentrates weight near its periphery in the form of magnets, yet is located at its centre, thus maximising any torque effects that occur. We may charitably assume that the design defects in this system are accidental, an assumption supported by the standard of the rest of the electrical equipment once fitted to British bikes.

It is not uncommon for the owner of a



The standard arrangement is shown at top. Rotor is held in place by clamping effect of nut and spacer and positioned by a woodruff key (not shown). Electrical drag, crankshaft pulses and acceleration and weight around the periphery make this a less than ideal set-up. Creasey's modification ensures positive location by tapered spacers and peripheral drive by studs.